No. 5,801,858 (hereinafter "ROBERTS") or U.S. Patent No. 5,914,794 (hereinafter "FEE") or U.S. Patent No. 5,959,767 (hereinafter "FATEHI").

By this amendment, Applicants cancel claims 77-80. Applicants have further amended claim 81 to improve form. Applicants respectfully request that the application be reconsidered in view of the above amendments and the following remarks. Claims 81 and 82 remain pending.

In paragraph 3 of the Office Action, the Examiner rejected claims 77-82 under 35 U.S.C. §112, second paragraph, as being indefinite for allegedly failing to particularly point out and distinctly claim the subject matter which Applicants regard as the invention. Claims 77-80 have been canceled, therefore, the rejection of these claims is moot. The Office Action appears to object to the use of the terms "first" and "second," as related to the claimed fine wavelength division multiplexers and demultiplexers. Applicants have deleted the terms "first" and "second" from pending claim 81. Applicants believe that this amendment should obviate any concerns the Examiner may have with respect to these terms. In view of this amendment, Applicants believe that claims 81 and 82 particularly point out and distinctly claim the subject matter that Applicants regard as the invention. Withdrawal of the rejection of claims 81 and 82 under 35 U.S.C. §112, second paragraph is, therefore, respectfully requested.

In paragraph 5 of the Office Action, the Examiner rejected claims 77-82 as allegedly being unpatentable over LI in view of ROBERTS, FEE or FATEHI. Claims 77-80 have been canceled by the present amendment and, therefore, the rejection of these claims is moot. In rejecting claim 81, the Office Action admits (pg. 3) that LI "does not disclose a plurality of

first and a second optical line amplifiers for amplifying the different respective subgroups of first and second set of optical signals." The Office Action, however, alleges (pgs. 3-4) that ROBERTS, FEE, or FATEHI teaches such a feature. The Office Action further alleges (pg. 4) that FATEHI teaches that optical line amplifiers can be configured to "substantially equalize gain across the set of channels within the operating window." Applicants respectfully traverse the rejection of claims 81 and 82 and submit that the Office Action has failed to make out a *prima facie* case of obviousness.

As one requirement for establishing a *prima facie* case of obviousness, the prior art reference (or references when combined) cited by the Office Action must teach or suggest all of the claim features. In re Vaeck, 947 F.2d 488, U.S.P.Q.2d 1438 (Fed. Cir. 1991). See M.P.E.P. § 2143. Applicants respectfully submit that the references cited by the Office Action, either singly or in combination, do not teach or suggest each and every feature of claim 81.

On page 3, the Office Action cites ROBERTS for allegedly disclosing an optical communication system that includes bi-directional transmission and reception. As described in column 5, line 45 through column 7, line 21, ROBERTS discloses the use of a bi-directional amplifier 15 for amplifying optical signals traveling in opposite directions across a single optical fiber 1 (see FIG. 1B). Details of the bi-directional amplifier 15 are shown in FIG. 3, and described in column 6, line 63 through column 7, line 21. As described, the bi-directional amplifier 15 uses a first gain length 27 for amplifying "red" wavelength signals traveling in one direction across optical fiber 1 and a second gain length 31 for amplifying "blue" wavelength signals traveling in a second direction across optical fiber 1. As disclosed

in column 9, lines 23-34, FIGS. 7A, 7B and 7C illustrate more sophisticated bi-directional amplification schemes in which there is more than one signal traveling in each direction on optical fiber 1. ROBERTS, thus, discloses the use of a bi-directional amplifier for amplifying optical signals traveling in two different directions. ROBERTS, however, does not suggest or disclose separate sets of optical line amplifiers that amplify different subwindows traveling in different directions. ROBERTS, thus, does not suggest or disclose "a first plurality of optical line amplifiers, each of the first plurality of optical line amplifiers configured to amplify a different respective subwindow" traveling in a first direction or "a second plurality of optical line amplifiers, each of the second plurality of optical line amplifiers configured to amplify a different respective subwindow" traveling in a second direction, as recited in claim 81. Additionally, as is implicitly admitted on page 4 of the Office Action, ROBERTS does not suggest or disclose, "wherein the first and second plurality of optical line amplifiers are configured to substantially equalize gain across the set of channels within the operating window," as is further recited in claim 81.

Turning to FEE, the Office Action, on pg. 3, cites this reference for allegedly disclosing the use of optical line amplifers along different optical fiber lines for amplifying different bands of optical signals. In column 3, line 35 through column 4, line 6, FEE discloses an optical cable 13 that includes multiple individual optical fibers 19a-19n. Associated with each of the individual optical fibers 19a-19n is an optical amplifier 23a-23n that amplifies optical signals traveling through a respective optical fiber (see column 3, lines 66-67). As is apparent from the direction of the symbols representing the optical amplifiers 23a-23n in FIG. 1, FEE merely discloses the amplification of optical signals traveling in a

single direction across multiple optical fibers. FEE, thus, does not suggest or disclose "a first plurality of optical line amplifiers, each of the first plurality of optical line amplifiers configured to amplify a different respective subwindow" traveling in a first direction and "a second plurality of optical line amplifiers, each of the second plurality of optical line amplifiers configured to amplify a different respective subwindow" traveling in a second direction, as recited in claim 81. Also, as is implicitly admitted by the Office Action on page 4, FEE does not contain any suggestion or teaching of "the first and second plurality of optical line amplifiers" being "configured to substantially equalize gain across the set of channels within the operating window," as further recited in claim 81.

Turning also to FATEHI, the Office Action alleges, on pages 3 and 4, that FATEHI teaches optical line amplifiers disposed along different fiber lines that can be configured to "substantially equalize gain across the set of channels within the operating window." FATEHI discloses an optical cross-connect switch that uses multiple pumps 104 and star couplers 102 for selecting which individual optical signals 101 ($I_1 - I_4$), traveling in only one direction, are to be switched out selected optical outputs 106 (O_1-O_4) of the cross-connect arrangement (see FIG. 1 and column 3, lines 1-51). Each of the optical amplifiers 103 of FATEHI amplifies a single optical signal received via an associated star coupler 102 (see column 3, lines 12-17). Applicants note that the portion of FATEHI cited by the Office Action on page 4 (column 4, lines 11-34) merely discloses the equalization of the gain of individual optical signals selected for switching through the cross-connect arrangement and traveling in a single direction. Since FATEHI merely discloses the amplification of individual optical signals traveling in a single direction across a cross-connect switch, FATEHI, does not suggest or disclose "the first

and second plurality of optical line amplifiers" being "configured to substantially equalize gain across the set of channels within the operating window" where the operating window comprises "a first set of subwindows traveling in a first direction and a second set of subwindows traveling in a second direction," as recited in claim 81. FATEHI further does not suggest or disclose "a first plurality of optical line amplifiers, each of the first plurality of optical line amplifiers configured to amplify a different respective subwindow of the first set of subwindows" and "a second plurality of optical line amplifiers, each of the second plurality of optical line amplifiers configured to amplify a different respective subwindow of the second set of subwindows," as recited in claim 81.

The Office Action further appears, at pages 3-4, to be taking Official Notice, alleging that "it is well known that optical line amplifiers can be placed anywhere along different transmission paths to restore the signal to a desired level." Applicants respectfully submit that the Office Action's apparent Official Notice does not address the feature recited in claim 81, which recites that separate groups of optical line amplifiers may be used in a system for equalizing gain across a set of channels within an operating window of a fiber communication network and for amplifying different respective subwindows of first and second sets of subwindows that travel in different directions in a coarse wavelength division multiplexing/demultiplexing and fine wavelength division multiplexing/demultiplexing scheme. Applicants, thus, respectfully submit that the Office Action's oversimplification of the features of claim 81 does not address the relevant features recited in claim 81.

In view of the above remarks, Applicants respectfully submit that the disclosures of ROBERTS, FEE and FATEHI do not supply the features of claim 81 that are admitted by the

Office Action as not being disclosed by LI. For at least this reason, Applicants submit that the Office Action has failed to make out a *prima facie* case of obviousness.

A further requirement for establishing a *prima facie* case of obviousness is that there must be some reason, suggestion, or motivation to combine reference teachings. In re Vaeck, 947 F.2d 488, U.S.P.Q.2d 1438 (Fed. Cir. 1991). See M.P.E.P. § 2143. Applicants respectfully submit that the Office Action has not provided a sufficient reason, suggestion, or motivation for combining the teachings of ROBERTS, FEE, or FATEHI with the teachings of LI. The Office Action alleges (at pg. 4) that "it would have been obvious to a person of ordinary skill in the art at the time of invention to incorporate a plurality of optical line amplifiers such as the ones of Roberts, or Fee, or Fatehi along the respective optical fiber lines in the multiplex/demultiplex transmission system of Li in order to boost the respective subgroup of optical signals that are attenuated during the transmission." The Office Action, thus, asserts that, since ROBERTS, FEE and FATEHI teach the use of optical amplifiers for amplifying optical signals, that it would have been obvious to combine that broadly stated teaching to achieve the specifically claimed amplification of the subwindows of the bi-directional signal traffic. As discussed above, FATEHI and FEE disclose the amplification of individual optical signals, and not the amplification of "different respective subwindows" of an operating window where each subwindow comprises a plurality of channels from a set of channels, as recited in claim 81. Applicants, therefore, respectfully submit that it would not have been obvious to combine the teachings of FATEHI or FEE, which merely disclose the amplification of individual optical signals, with the teachings of LI, to produce the claimed amplification of "different respective subwindows."

As further discussed above, ROBERTS merely discloses the use of a single bi-directional amplifier for amplifying optical signals traveling in two different directions across a single optical fiber, and not the use of first and second sets of multiple amplifiers, with each amplifier of the sets of multiple amplifiers amplifying a "different respective subwindow" of the operating window. Applicants, therefore, respectfully submit that it would not have been obvious to combine the teachings of ROBERTS, which merely discloses use of a single bi-directional amplifier for amplifying optical signals traveling in two different directions across a single optical fiber, with the teachings of LI, to produce the claimed amplification of "different respective subwindows," as recited in claim 81.

In view of the remarks above, Applicants respectfully submit that the Office Action has failed to make out a *prima facie* case of obviousness. Withdrawal of the rejection of claim 81 under 35 U.S.C. § 103(a) is, thus, respectfully requested.

Claim 82 depends from claim 81. Applicants, therefore, respectfully request the withdrawal of the rejection of this claim for at least the reasons set forth with respect to claim 81 above.

In view of the foregoing amendments and remarks, Applicants respectfully request the Examiner's reconsideration of this application, and the timely allowance of the pending claims.

To the extent necessary, a petition for an extension of time under 37 CFR 1.136 is hereby made. Please change any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account No. 13-2491 and please credit any excess fees to such deposit account.

Respectfully submitted,

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MARKED-UP VERSION OF AMENDMENT SHOWING CHANGES MADE

Claim 81 has been amended as follows:

81. (Amended) A system for equalizing optical gain across a set of channels within an operating window of a fiber communication network, comprising:

a coarse wavelength division multiplexing/demultiplexing unit configured to support bi-directional optical signal traffic within the operating window, the operating window comprising a first set of subwindows traveling in a first direction and a second set of subwindows traveling in a second direction, the first set of subwindows comprising different channels of the set of channels than the second set of subwindows, wherein each subwindow of the first and second set of subwindows comprises a plurality of channels from the set of channels;

a [first] plurality of fine wavelength division multiplexers configured to support uni-directional traffic comprising the first set of subwindows;

a [second] plurality of fine wavelength division demultiplexers configured to support uni-directional traffic comprising the second set of subwindows;

a first plurality of optical line amplifiers, each of the first plurality of optical line amplifiers configured to amplify a different respective subwindow of the first set of subwindows traveling in the first direction; and

a second plurality of optical line amplifiers, each of the second plurality of optical line amplifiers configured to amplify a different respective subwindow of the second set of subwindows traveling in the second direction,

wherein the first and second plurality of optical line amplifiers are configured to substantially equalize gain across the set of channels within the operating window.